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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/684,684	10/15/2003	Kohci Yamanaka	Q76899	3402
23373 7590 08/02/2007 SUGHRUE MION, PLLC 2100 PENNSYLVANIA AVENUE, N.W. SUITE 800 WASHINGTON, DC 20037			EXAMINER GARCIA, ERNESTO	
			ART UNIT 3679	PAPER NUMBER
			MAIL DATE 08/02/2007	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/684,684

Applicant(s)

YAMANAKA ET AL.

Examiner

Ernesto Garcia

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3679

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 July 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,4-11 and 21-26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,4-11 and 21-26 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 October 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. _____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on July 9, 2007 has been entered.

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Drawings

The drawings are objected to because the cross-hatching for the coils 8 and 9, in Figures 2 and 5, is not proper. See MPEP 608.02(IX) for proper cross-hatching for coils. The surrounded member 5 should also be cross-hatching according to a magnet since it is made of a magnetic material thus being magnetic. Further, the first caulked part 60a, in Figures 2 and 5, does not correspond to that shown in Figure 9. The cross-section X-X shown in Figure 10 and the blown-up view in Figure 11 are not an actual

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representation of the cross-section taken in Figure 9. Note that the axial groove should be intersecting past the circumferential groove. A closer view of Figure 11 reveals that the axial groove stops short at the bottom of the circumferential groove looking into the paper. Note that the circumferential groove in Figure 5 end at the bottom of the axial groove as compared to Figure 9. Further, it is unclear why Figures 9 and 12 shows the caulking with curvatures. Are the sidewalls of the circumferential groove curved at the intersection but not at section XIII-XIII? Isn't the circumferential groove square all around? Further, why isn't the top surface of the caulked portion in the axial groove in Figure 11 dented? It is clear that the bottom surface of the caulked portion in the axial groove is dented but not the top surface. Further, if Figures 20A-20D is the circumferential groove at the intersection, why isn't the bottom of the axial groove showing?

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended". If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the

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renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the examiner does not accept the changes, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

The disclosure is objected to because of the following informalities:

on paragraph [045], line 3, "20, 21" should be "21, 20" to correspond to the inner and outer rings correctly; and,

the description of Figure 18 is not accurate since the component in Figure 4 is not similar to Figure 18. Note that this occurs in some other descriptions of the figures. Appropriate correction is required.

The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: "a first shaft member" recited in claim 1, line 2, and "a second shaft member" recited in claim 1, line 6, and "the cylindrical member having a portion facing the surrounded member" recited in claim 1, lines 9-10.

Claim Objections

Claims 1 and 21 objected to because of the following informalities:

regarding claims 1 and 21, "detecting" in line 14 should be --able to detect-- since the claim is not a living claim which requires that a torque be acting all the time. Appropriate correction is required. For purposes of examining the instant invention, the examiner has assumed these corrections have been made.

Claim Rejections - 35 USC § 112

Claims 21-26 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Regarding claim 21, the recitation "the cylindrical member is spaced apart from the shaft member by a clearance except at the position corresponding to the at least one axial groove" in lines 20-21 is not supported by the written description requirement. In particular, it was established that the clearance was provided everywhere except the caulked portion. This limitation now adds that the clearance is present everywhere

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except at the entire axial groove. See original paragraph [062] which does not exclude the axial groove.

Regarding claim 25, the recitation “the caulked portion is provided to the cylindrical member, only at the intersection of the axial groove and the circumferential groove” in lines 1-3 is not supported by the written description requirement. Note that the drawings, in particular Figure 11, shows caulking beyond the intersection. Note that the intersection would only entail the portions of the grooves that intersect but Figure 11 shows the caulking extending beyond the intersection.

Regarding claim 26, the recitation “the clearance exists between caulked portions which are provided to the cylindrical member at the positions corresponding to the plurality of axial grooves” in lines 3-4 is nowhere found in the disclosure and thus is not supported by the written description requirement. Further, the drawings do not establish the clearance 60c, shown in Figures 20A-20D, between caulked portions but rather the cylindrical member and the outer surface of the shaft member.

Regarding claims 23 and 24, the claims depend from claim 21 and therefore do not comply with the written description requirement.

Claims 25 and 26 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 25, the recitation "only at the intersection of the axial groove and the circumferential groove" in lines 2-3 is misdescriptive and/or inaccurate. Note that the caulked portion in Figure 11 runs beyond the intersection of the axial groove and the circumferential groove such that caulking exists along the circumferential direction beyond the axial groove.

Regarding claim 26, the recitation "the clearance exists between caulked portions" in line 3 is misdescriptive and/or inaccurate. Note that Figures 20A-20D established the clearance 60c between the cylindrical member and the outer surface of the shaft member and not at the caulked portions to constitute "between the caulked portions".

Claim Rejections - 35 USC § 103

Claims 1, 4-7, 9, 11, and 23-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamanaka et al., 2003/0136604, in view of Dent, 3,652,111.

Regarding claim 1, Yamanaka et al. disclose, in Figure 5, a structure comprising a first shaft member 2, a second shaft member 3, a surrounded member 5, a cylindrical member 60, and a torque detection coil 8. The first shaft member 2 is formed out of a first material. The first shaft member 2 has an outer periphery formed with an axial groove 2e, and a circumferential groove 2d (see Figure 6). The axial groove 2e and the circumferential groove 2d have a cross-section having opposed faces A1 (see marked-up attachment) substantially parallel to each other. The second shaft member 3 is fixed to the first shaft member 2 via a torsion bar 4. The surrounded member 5 is formed out of a magnetic material and fixed to the second shaft member 3 (paragraph [0029]). The cylindrical member 60 is fitted to the outer periphery of the first shaft member 2. The cylindrical member 60 has a portion facing the surrounded member 5. The cylindrical member 60 is formed out of a second material greater in linear expansion coefficient than the first material (paragraph [0043], aluminum is greater in linear expansion than iron used to make the shafts). The second material is conductive non-magnetic metallic material. A caulked portion 2f is provided to the cylindrical member 60 partly at an intersection of the axial groove 2e and the circumferential groove 2d. The caulked portion 2f has a continuous and deformed inner surface in press contact with the opposed faces A1 of the axial groove 2e and the circumferential groove 2d.

However, Yamanaka et al. fails to disclose the axial groove 2e being greater in depth than the circumferential groove 2d. Dent teaches, in Figure 3, an axial groove 64 being greater in depth than a circumferential groove 36 (col. 4, lines 35-38). Dent does

not explicitly explain the reason for making the axial groove greater in depth than that of the circumferential groove; however, it appears that placing the axial groove or the circumferential groove greater in depth than that of the other allows swaging of the material to penetrate deeper into the groove to hold with a greater compression force as compared to the depths being the same. Therefore, as taught by Dent, it would have been obvious to one of ordinary skill in the art at the time the invention was made to make the axial groove be greater in depth than the circumferential groove to swage the caulked portion deeper into the axial groove to provide a greater compression force to connect the first shaft member to the cylindrical member.

Regarding claim 4, a circumferential width of the caulked portion is greater than a circumferential width between the opposed faces **A1** of the axial groove **2e** at the intersection.

Regarding claim 5, a first caulked part corresponding to the circumferential groove **2d** and a second caulked part corresponding to the axial groove **2e**. The second caulked part is arranged substantially in a middle of the first caulked part.

Regarding claim 6, the axial groove **2e** comprises a plurality of groove portions in a circumferential direction.

Regarding claim 7, the groove portions are three in number.

Regarding claim 9, the cylindrical member **60** is apart from the first shaft member **2**. However, Yamanaka et al. fails to disclose the cylindrical member being apart from the first shaft member by a clearance except at the caulked portion **18**. Applicants are reminded that using the technique of Dent allows for a clearance to be present since one needs to slidably fit the cylindrical member to the first shaft member thus requiring a clearance to provide for a sliding fit (col. 4, lines 14-21). Therefore, as taught by Dent, it would have been obvious to one of ordinary skill in the art at the time the invention was made to make the cylindrical member apart from the first shaft member by a clearance except at the caulked portion to provide for the shaft member to slide fit over the first shaft member which allows for ease of manufacturing.

Regarding claim 11, the first shaft member **2** comprises an input shaft and an output shaft. The first shaft member **2** comprises the input shaft. The second shaft member **3** comprises the output shaft. The input shaft and the output shaft are arranged relatively rotatably with respect to each other. Regarding the intended use recitation, it is the patentability of the product and not how it is intended to be used that is to be determined. No structure is imparted to the shafts by this recitation of intended used. Nevertheless, the input shaft and the output shaft can be used for a torque sensor of an electric power steering apparatus.

Regarding claim 21, Dent discloses, in Figures 4 and 8, a structure comprising a first shaft member **2**, a second shaft member **3**, a surrounded member **5**, a cylindrical member **60**, and a torque detection coil **8**. The first shaft member **2** is formed out of a first material. The first shaft member **2** has an outer periphery formed with at least one of an axial groove **2e** and a circumferential groove **2d**. The axial groove **2e** has a cross-section having opposed faces **A1** (see marked-up attachment) substantially parallel to each other. The second shaft member **3** is fixed to the first shaft member **2** via a torsion bar **4**. The surrounded member **5** is formed out of a magnetic material and fixed to the second shaft member **3**. The cylindrical member **60** is provided to the outer periphery of the first shaft member **2**. The cylindrical member **60** has a portion facing the surrounded member **5**. The cylindrical member **60** is formed out of a second material greater in linear expansion coefficient than the first material. The second material is a conductive non-magnetic metallic material. A caulked portion **2f** is provided to the cylindrical member **60** at a position corresponding to the axial groove **2e** of the first shaft member **2**. The caulked portion has a deformed inner surface in press contact with the opposed faces **A1** of the circumferential groove **2d**. The cylindrical member **60** is spaced apart from the first shaft member **2**.

However, Yamanaka et al. fails to disclose the cylindrical member being apart from the first shaft member by a clearance except at the position corresponding to the axial groove **2e**. Applicants are reminded that using the technique of Dent allows for a clearance to be present since one needs to slidably fit the cylindrical member to the first

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shaft member thus requiring a clearance to provide for a sliding fit (col. 4, lines 14-21). Therefore, as taught by Dent, it would have been obvious to one of ordinary skill in the art at the time the invention was made to make the cylindrical member apart from the first shaft member by a clearance except at the caulked portion to provide for the shaft member to slide fit over the first shaft member which allows for ease of manufacturing.

Regarding claim 23, the clearance **A1** is sufficient to loosely fit an inner periphery side of the cylinder member **60** over the outer surface of the first shaft member **2**.

Regarding claim 24, the clearance **A1** is established at ordinary temperature.

Regarding claim 25, the caulked portion is provided to the cylindrical member at the intersection of the axial groove and the circumferential groove.

Regarding claim 26, the first shaft member **2** has the outer periphery formed with axial grooves. Further, given the modification, the clearance will exist between caulked portions provided to the cylindrical member at the positions corresponding to the axial grooves.

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yamanaka et al., 2003/0136604, in view of Dent, 3,652,111, as applied to claims 1, 4-7, 9, 11, 21, 23, and 24, and further in view of Fujioka et al., 4,716,756.

Regarding claim 8, Dent, as discussed, fails to disclose the axial groove **64** and the circumferential groove **36** being rectangular. Applicants are reminded that a change in the shape of a prior art device is a design consideration within the skill of the art. In re Dailey, 357 F.2d 669, 149 USPQ 47 (CCPA 1966). Fujioka et al. equally teach a groove being rectangular to make a connection. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to design the groove be rectangular in cross section as taught by Fujioka et al., Fig. 8, since such groove will perform equally well to make a connection.

Claims 10 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamanaka et al., 2003/0136604, in view of Dent, 3,652,111, as applied to claims 1, 4-7, 9, 11, 21, 23, and 24, and further in view of Edgemond, Jr., 3,642,311.

Regarding claim 10, Dent fails to disclose the axial groove **64** having an opening edge formed at an acute angle. Edgemond, Jr. teaches, in Figure 2, an axial groove **18** having an opening edge formed at an acute angle. Edgemond, Jr. does not state why the opening edge is formed at an acute angle. Applicant is reminded that side faces of a rectangular axial groove formed on a cylindrical surface inherently form an opening edge at an acute angle as part of an inherent feature when using rectangular grooves. Therefore, as taught by Edgemond, Jr., it would have been obvious to one of ordinary skill in the art at the time the invention was made to make the axial groove of Dent with

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an opening edge formed at an acute angle as part of forming an axial groove being rectangular on a cylindrical surface instead of using semicircular grooves since a rectangular groove requires less machining than a semicircular groove.

Regarding claim 22, given the modification the opening edge will be inherently formed at an acute angle at the intersection since all the grooves will be modified to rectangular grooves.

Response to Arguments

Applicants' arguments with respect to claims 1, 4-11, and 21-26 have been considered but are moot in view of the new grounds of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ernesto Garcia whose telephone number is 571-272-7083. The examiner can normally be reached from 9:30AM-6:00PM. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Daniel P. Stodola can be reached at 571-272-7087.

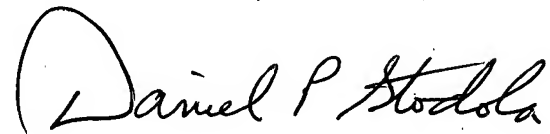
Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

E.G.

E.G.

July 30, 2007

Attachment: one marked-up page of Yamanaka et al., 2003/0136604



DANIEL P. STODOLA
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 3600

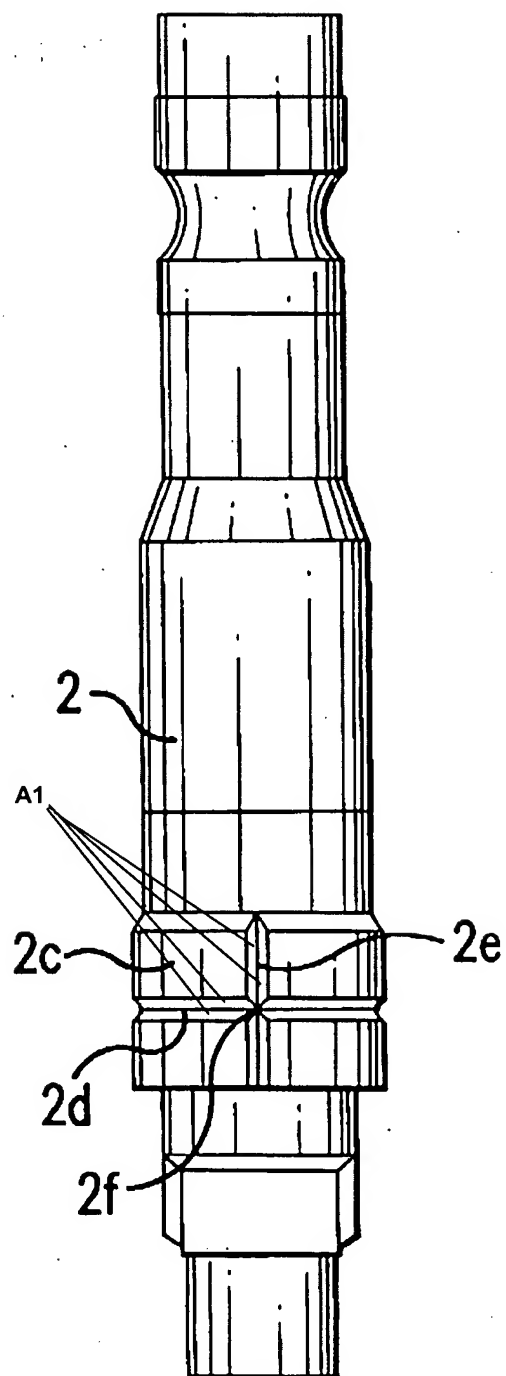


FIG. 6

Notice of References Cited	Application/Control No. 10/684,684	Applicant(s)/Patent Under Reexamination YAMANAKA ET AL.	
	Examiner Ernesto Garcia	Art Unit 3679	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-2003/0136604	07-2003	Yamanaka et al.	---
*	B	US-6,557,425	05-2003	Kamiya et al.	73/862.335
	C	US-			
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N	JP 2000162059 A	06-2000	Japan	CHIKARAISHI, KAZUO	
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
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	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.